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(E73-10894) MANAGEMENT OF NATURAL
RESOURCES THROUGH AUTOMATIC CARTOGRAPHIC
INVENTORY Progress Report, Oct. 1972 -
Mar. 1973 (Service de la Carte de la
Vegetation CNRS) - 33 p HC

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A. R. N. I. C. A.

MANAGEMENT OF NATURAL RESOURCES
THROUGH
AUTOMATIC CARTOGRAPHIC INVENTORY

REPRODUCED BY
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TYPE I PROGRESS REPORT
for Period October 1972-March 1973
(n° 2)

PRICES SUBJECT TO CHANGE

June 1973

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- A. Plot of data
- B. List of receipt data
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ABSTRACT

1 - 1

The following significant results were obtained :

Over those parts of the ARNICA test-site where ERTS data were available, the search for correspondences between images and ground truth acquired by the Vegetation and Geology Maps was quite positive.

1. The probability of recognition of soil use types can be estimated at :
 - 100 % for water plans, rivers, canals, swamplands, and wetlands.
 - 80-100 % for the major types of forestry, farmland zones, moorlands and pasturelands, and urbanization.
 - 20-50 % for communication lines.
 - 60-80 % for :
 - forestry species (deciduous or conifer)
 - organization of agricultural areas (dry farming or irrigated fields).
 - 40-60 % for :
 - finer discrimination between forest types (deciduous or conifer)
 - more accurate identification of cultivations.
 - 60-90 % for major geological features.

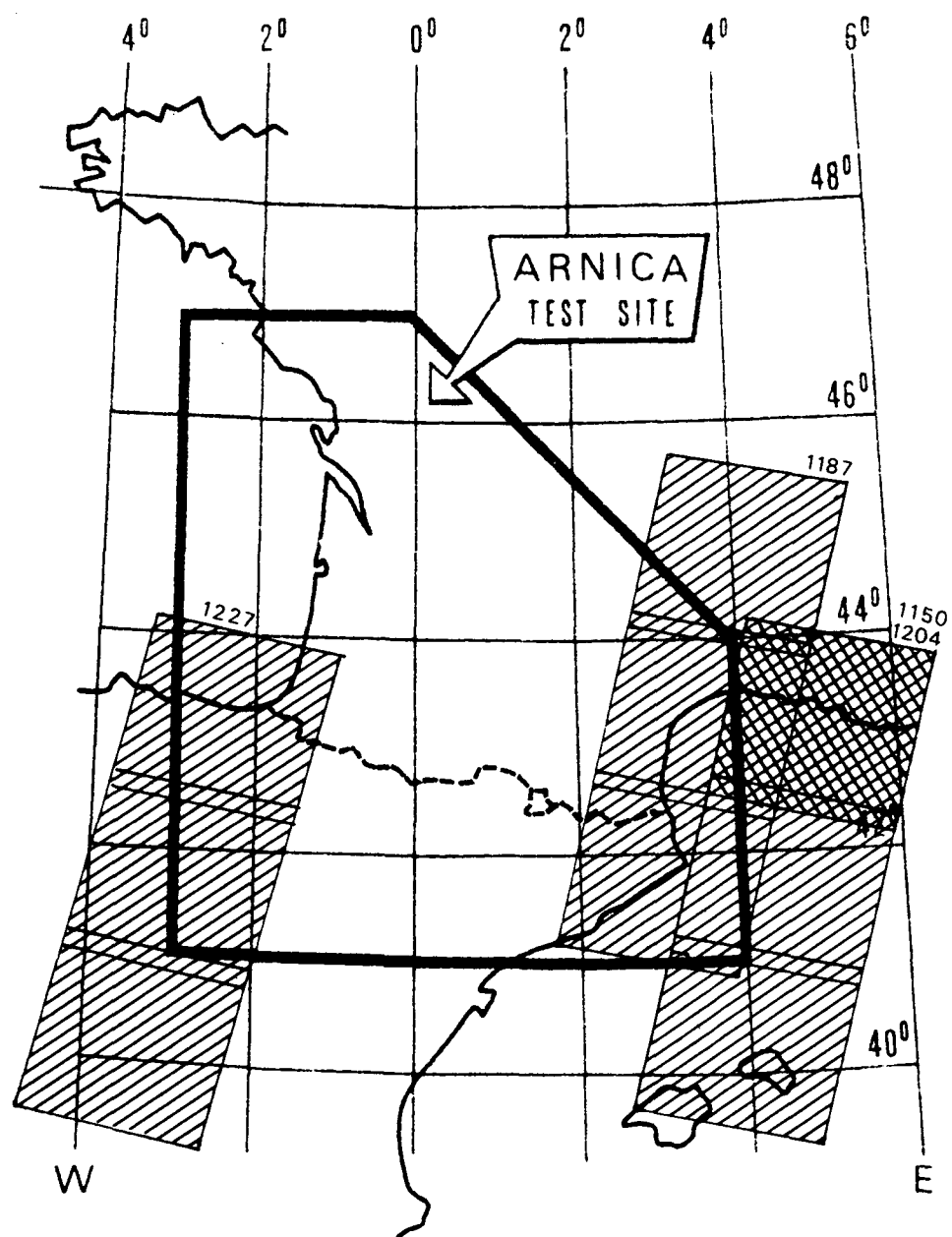
These percentages will be improved upon as soon as it is possible to use the repetitive imagery.
2. An early use of automatic cartography using ERTS imagery was made possible for pine forests in the Central Pyrenees, the densitometric signatures of which were particularly significant.
3. Important observations were made in related fields : water resources, snow survey, estuary dynamics, meteorology.

MAJOR PROBLEMS

- . Images received between October, 1972 and March, 1973 cover mainly the marginal areas of the test-site and are rarely repetitive. The cloud cover is extensive for images of French territory.
No total coverage is available to date.
- . Only the part of the test-site adjacent to Spanish territory provides an almost complete, although heterogenous, coverage.
- . For this reason the search for image-object correlations has had to be conducted to date in the least known sections of the test-site, rather than in higher priority areas. Thus the choice of themes of transposition between qualitative exploration and quantitative exploitation have been limited.
- . Experiments planned for ground-based measurements and checking of ground truth were indeed made at several points on the test-site during the passing of the satellite (November, December, January), However, although atmospheric conditions seemed favorable, the results cannot be used, because the corresponding ERTS images were not available.

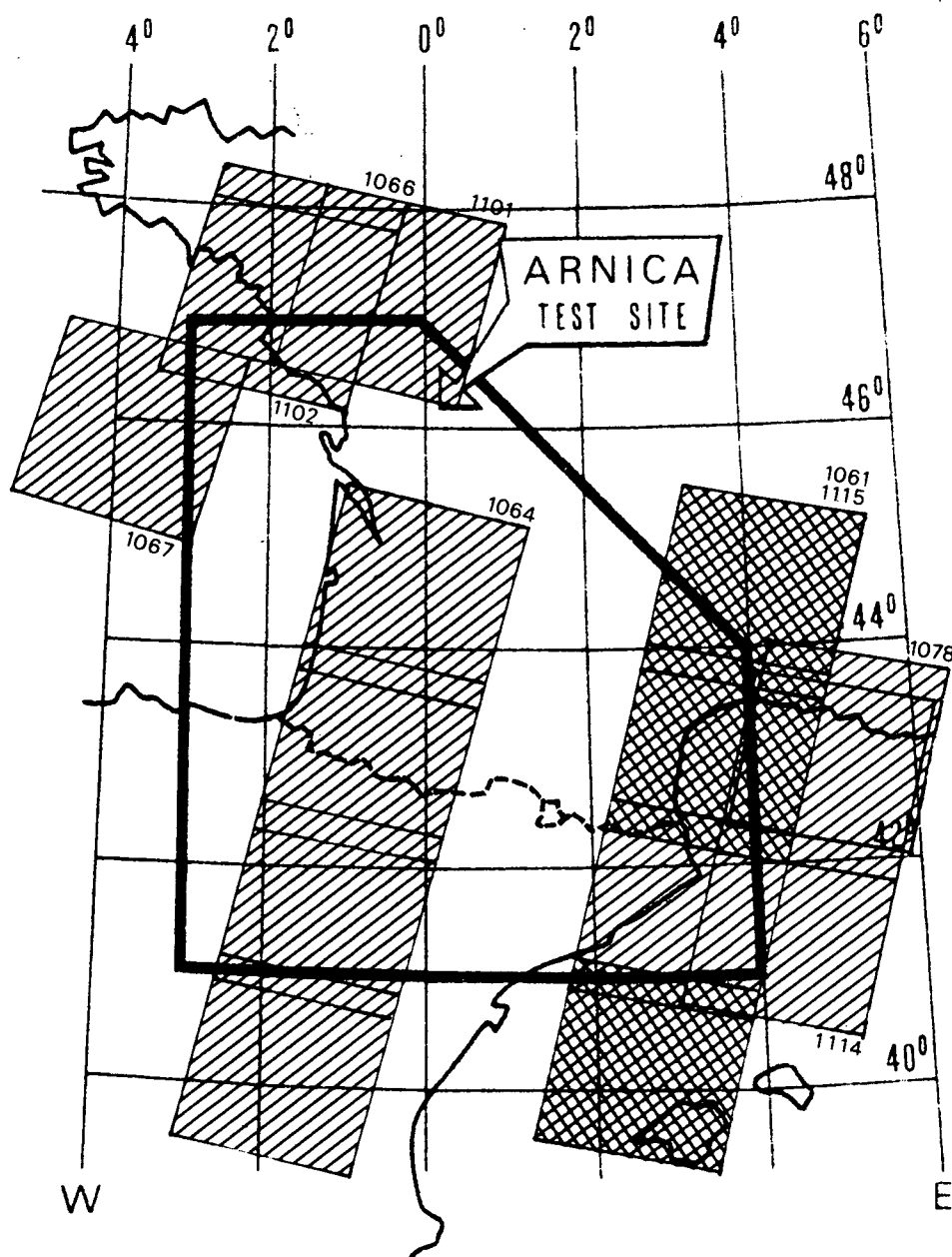
ATTACHMENT A 1 of 2

Plot of data
received on October-December 1972



ATTACHMENT A 2 of 2

Plot of data
received on January-May 1973



ATTACHMENT B 1 of 2

LIST OF DATA RECEIVED
on October - December 1972

F M T M S S	Data of observation	M 4 5 6 7	T 7	P 7
1061.10015	09-22-72	2 2 2 2	2	2
1061.10022	-	2 2 2 2	2	2
1061.10031	-	2 2 2 2	2	2
1064.10190	09-25-72	2 2 2 2	2	2
1064.10193	-	2 2 2 2	2	2
1064.10195	-	2 2 2 2	2	2
1064.10202	-	2 2 2 2	2	2
1066.10294	09-27-72	1 1 1 1	1	
1067.10355	09-28-72	1 1 1 1	1	
1078.09564	10-09-72	1 1 1 1	1	
1101.10244	11-01-72	1 1 1 1	1	
1102.10302	11-02-72	1 1 1 1	1	
1114.09572	11-14-72	1 1 1 1	1	
1114.09575	-	1 1 1 1	1	
1115.10024	11-15-72	1 1 1 1	1	
1115.10030	-	1 1 1 1	1	
1115.10033	-	1 1 1 1	1	
1115.10035	-	1 1 1 1	1	

ATTACHMENT B 2 of 2

LIST OF DATA RECEIVED
on January - May 1973

F M T M S S	Data of observation	M				T	P
		4	5	6	7	7	7
1150.09572	12-20-72	1	1	1	1	1	
1187.10023	01-26-73	1	1	1	1	1	
1187.10025	-	1	1	1	1	1	
1187.10032	-	1	1	1	1	1	
1204.09573	02-12-73	1	1	1	1	1	2
1204.09575	-	1	1	1	1	1	2
1204.09582	-	1	1	1	1	1	2
1227.10262	03-07-73	1	1	1	1	1	2
1227.10265	-	1	1	1	1	1	2
1227.10271	-	1	1	1	1	1	2

ACCOMPLISHMENTS DURING THE REPORTING PERIOD

A. Qualitative Studies

. Searches for correlations between ERTS imagery and available phytogeographic and geological maps were developed in favorable sections : Northeastern Spain, the Mediterranean shoreline, the Atlantic coast.

. These developments resulted in a detailed study of the Ebre Basin (cf. Type II Progress Report n° 1 - Study by P. GOUAUX, Part I, Chapter 1, pp. 11 to 26).

B. Quantitative Studies

. These were mainly concerned with developing a chain of transfer operations between the definition of a qualitative correspondence code and the automatic mapping of natural resources.

. Two publications resulted from this research (cf. Type II Progress Report n° 1 - Study by G. FLOUZAT, Part II, Chapter 2, pp. 27 to 55 - Study by M. MONCHANT, Part II, Chapter 3, pp. 56 to 67).

C. Experiments

. Two series of experimental systems were developed :

a) airborne systems (cf. Type II Progress Report n° 1 - Study by PICCA, Part II, Chapter 4, pp. 68 to 76).

b) ground measurement system with a mobile articulated arm making repeated observations from sensors exploring object-ground reflectance in the same wavelength as ERTS and aircraft.

ACCOMPLISHMENTS PLANNED FOR NEXT PERIOD

A. Qualitative Studies

The quality of the images recently received makes the search for the following correspondences foreseeable in the immediate future :

- Snowfall conditions in the French Massif Central.
- Spectral signatures for vegetation types in France (forests and agriculture).
- Study of coastal regions.

B. Quantitative Studies

These will emphasize the following :

- The compression of computer data and the simplification of transfer operations.
- Elaboration of a densitometric correspondence code for the automatic mapping of natural resources.

C. Experiments

It is no longer realistic to consider making ground-based experiments simultaneous with the ERTS imagery.

The continuing research will therefore be oriented toward the preparation of airborne and ground-based experimental systems for use in the framework of the ERTS B program.

DISCUSSION OF SIGNIFICANT RESULTS

1. AGRICULTURE / FORESTRY

A. Crop survey :

(Data	1078-09564	4,5,6,7
	1114-09572	4,5,6,7
	1150-09572	4,5,6,7)

In the alluvial zone of the Rhone delta :
search for comparative spectral signatures
for vineyards, rice fields, prairies, irrigated
farmlands.

B. Timber survey

(Data 1064-10190)

Forests of the Gascony Moorlands :
easy to distinguish (multispectral scanner
bands 5,7) between conifers (Pinus pinaster)
and deciduous (Quercus pedunculata).

(Data 1064-10195 and 1115-10033)

On Spanish territory (Ebre Basin and
Catalogna) definite distinctions between
Pinus silvestris and Pinus halepensis forests.

(Data 1066-10294)

Loire Basin : distinction between
deciduous (oak, beech) and conifer (forest and
shoreline pines) forestry.

F. Water utilization

- Definite identification of irrigated
zones in the Ebre Basin (Data 1064-10195).

- References for extensive irrigation
systems in the Gascony Moorlands.

DISCUSSION OF SIGNIFICANT RESULTS

2. LAND USE SURVEY and MAPPING

A. Land use classification

On all the documents analyzed the recognition of principal types of land use, with reference to the Vegetation Map, remains the essential purpose for using the images received.

In the sections where we can still use only single coverage, the comparative use of the four bands (particularly multispectral scanner bands 5 and 7) provides the key to essential categories of soil use : forests, conifers, deciduous, moorlands, cultivation.

- In sections where the coverage is repeated once or twice, the determination of landscapes can be more accurate and includes :

- forestry
- types of moorlands and pastures
- certain categories of cultivation.

B. Thematic mapping

A preliminary trial of automatic mapping was made for pine forests in the Central Pyrenees (cf. Type II Progress Report n° 1) (Data 1027-10135 4,5,7).

The search for densitometric signatures is being carried out on the following themes in order of increasing difficulty :

- major types of soil use
- forestry mapping
- agricultural mapping

F. Population density

Confirmation of the identification (by multispectral scanner bands 5 and 7) of all urban areas of any importance.

DISCUSSION OF SIGNIFICANT RESULTS

3. GEOLOGICAL STRUCTURE and LANDFORM SURVEY

I. Geomorphic and Landform surveys

The drainage pattern is equally apparent in most cases.

Coastal plains (Data 1066-20294-5 ; 1115-10030-4 ; 1115-10033-4) are particularly apparent on multispectral scanner bands 4 and 5, and a few on 6.

J. Lithologic surveys

The distinction between basement rock and surface sediments is easy to make on almost all documents. Stratified sedimentary series often provide characteristic images. (Data 1078-09564-7).

K. Structural surveys

- The extensive fault in the direction of Brittany known as the "Sillon de Bretagne" appears very clearly on data 1066-10294-5 and 4. This condition is due to the fact that the ends of wooded areas occupying small valleys, line up, outlining the North-northeastern section but stopping at the fault ; the South-southwestern section is entirely under cultivation. Here again it appears that the geological structures, even the very largest, are identified by their influence on the plant cover.

- The faults which divide up the ancient mountain ranges of Catalogna or separate them from the mezozoic or cenozoic basins appear on documents 1115-10033.

DISCUSSION OF SIGNIFICANT RESULTS

4. WATER RESOURCES

D. Limnology

(Data 1066-10294)

Easy recognition of vegetation types over
Tourbières (Grande Brière) and interior
lakes (Lake Grandlieu).

(Data 1064-10190)

Likewise for shoreline ponds in the
Gascony Moorlands.

(Data 1061-10022 and 1187-10025)

Likewise for Mediterranean ponds.

G. Snow survey

(Data 1187-10023)

Snow cover in the Massif Central shows
up very clearly (Morvan, Cévennes, Velay).

DISCUSSION OF SIGNIFICANT RESULTS

5. MARINE RESOURCES

F. Estuary dynamics

(Data 1064-10190)

Remarkable illustration of sedimentation
in the Arcachon Basin and the Gironde Estuary.

(Data 1066-10294)

Coastal dynamics shows up clearly in the
Estuary of the Loire (cf. F. Verger's reports).

6. METEOROLOGY

(Data 1114-09572)

Very significant action of the Mistral
(north wind) shown condensations in characte-
ristic wave forms which the wind provokes
when it comes into contact with sea air.

(Data 1187-10025)

Very remarkable illustration of a
Tramontane period (northwest wind) sweeping
the coast and pushing aside condensation
zones.

LIST OF PAPERS

8. GOUAUX, P., 1973. Study of land use pattern in northern Spain.
1. Qualitative processing. In ARNICA, Type II Progress Report n° 1, pp. 11-26.
9. FLOUZAT, G., 1973. Remote Sensing of forestry (Using ERTS 1 Data).
1. Identification. In ARNICA, Type II Progress Report n° 1, pp. 27-56.
10. MONCHANT, M., 1973. Digital procedures on Remote Sensing imagery for the ARNICA ERTS 1 Programm.
In ARNICA, Type II Progress Report n° 1, pp. 56-67.
11. PICCA, R., 1973. Study of a radiometer for visible wavelengths. In ARNICA, Type II Progress Report n° 1, pp. 68-76.
12. REY, P., CAMBOU, F., GOURINARD, Y.. 1973. Management of Natural Resources through Automatic Cartographic Inventory. Type II Progress Report for period August 72 - January 73. 1 Vol., 77 p., 25 fig. Toulouse, Mai 1973.

CONCLUSIONS

The great interest brought out in the first report has been confirmed for possibilities of using the documents received.

Several applications are under study and will be reported in detail in the Type II Progress Report.

In spite of the difficulties and delay involved in obtaining data, the documentation available to date will permit a deeper understanding of the search for characteristic spectral signatures and their automatic transposition.

Remaining Requirements

Because of their importance, we hope to be able to use the following :

- a) composite color type C (Multispectral scanner bands 4, 5, 7) for the following data :

1027-10135	1066-10294
1027-10141	1078-09564
1028-10193	
1064-10195	1187-10023
1064-10195	

- b) digital tapes for the following data :

1064-10190	1114-09572	1187-10025
1066-10294	1115-10030	1187-10032
1078-09564	1187-10023	

(See Data Request form).

8 - 1

ERTS - IMAGE DESCRIPTOR

Cf. ATTACHMENT C

(15 sheets)

A T T A C H M E N T C

ERTS IMAGE DESCRIPTOR FORM

USER NAME BEY Paul - Augustin

DATE 05.25.73

USER ID F0 433

AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	METEOROL.	STREAM	RIVER	CANAL	
1061 10015 5	✓				VEGETATION
1061 10015 6	✓	✓	✓	✓	MOUNTAIN
1061 10015 7	✓	✓	✓	✓	MOUNTAIN
1061 10022 5	✓				VEGETATION AGRICULTURE
1061 10022 7	✓	✓			ALLUVIAL PLAIN COAST COASTAL MARSH COASTAL DUNE DELTA DELTAIC COASTAL PLAIN HYDROLOGY LITTORAL DRIFT MEANDER SALMARSH SEA SEA GRASS VEGETATION
1061 10031 7	✓				SEA

ATTACHMENT C

ERTS IMAGE DESCRIPTOR FORM

USER NAME REY Paul - AugustinDATE 05.25.73USER ID FO 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	COAST	LAKE	FIREBREAK	CITY	
1064 10190 4	✓	✓	✓	✓	AIRFIELD COASTAL DUNE ESTUARY FOREST
1064 10190 5	✓	✓	✓	✓	AGRICULTURE AIRFIELD BAY BRIDGE COASTAL DUNE CONIFER CROPLAND ESTUARY FOREST ISLAND MEANDER METEOROLOGY STREAM SUBURBAN AREA VEGETATION VINEYARD
1064 10190 7	✓	✓	✓	✓	BAY BRIDGE COASTAL DUNE CONIFER CROPLAND ESTUARY DENDRITIC DRAINAGE FOREST MEANDER METEOROLOGY STREAM URBAN AREA VEGETATION
					◇

A T T A C H M E N T C

ERTS IMAGE DESCRIPTOR FORM

USER NAME REY Paul - AugustinDATE 05.25.73USER ID FO 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	CONIFER	FOREST	VEGETATION	LAKE	
1064 10193 5	✓	✓	✓	✓	COAST
1064 10193 7	✓	✓	✓	✓	ANTICLINE COAST COASTAL DUNE FOLD SEA SYNCLINE
1064 10195 5	✓	✓	✓	✓	AGRICULTURE ALLUVIAL PLAIN BARBED TRIBUTARY BASSIN AND RANGE BRUSH CONSEQUENT VALLEY CROPLAND CUESTA DECIDUOUS DROUGHT CONDITIONS HARDWOOD FOREST HYDROLOGY IRRIGATION MEANDER SALT FLAT STEPPE STREAM
1064 10195 7	✓	✓	✓	✓	ALLUVIAL PLAIN BASSIN AND RANGE CITY CROPLAND DROUGHT CONDITIONS HARDWOOD FOREST HYDROLOGY IRRIGATION SALT FLAT

ATTACHMENT C

ERTS IMAGE DESCRIPTOR FORM

USER NAME REY Paul - AugustinDATE 05.25.73USER ID FO 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	CONIFER	FOREST	VEGETATION	HYDROLOGY	
1064 10202 5	✓	✓	✓	✓	AGRICULTURE FOLD RIVER
1064 10202 7	✓	✓	✓	✓	DAM DROUGHT CONDITIONS FOLD RIVER
1066 10294 5	✓	✓	✓	✓	AGRICULTURE ALLUVIAL PLAIN BAY BEDROCK BOG CAPE COAST DECIDUOUS ESTUARY FAULT GULF HIGHWAY LAKE MARSH OCEANOGRAPHY PENEPLAIN SEA SEA GRASS STREAM
1066 10294 7	✓	✓	✓	✓	BAY BOG CAPE CITY COAST ESTUARY GULF ISLANDS LAKE MARSH SALT MARSH STREAM SEA

A T T A C H M E N T C

ERTS IMAGE DESCRIPTOR FORM

USER NAME REY Paul - AugustinDATE 05.25.73USER ID EQ 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	FOREST	MARSH	VEGETATION	SEA	
1078 09564 4	✓	✓	✓	✓	ALLUVIAL PLAIN METEOROLOGY SALTMARSH MOUNTAIN HARBOR
1078 09564 5	✓	✓	✓	✓	ALLUVIAL PLAIN COAST CONIFER DECIDUOUS DELTA GEOGRAPHY ISLAND ISTHMUS LITTORAL DRIFT LITTORAL TRANSPORT VINEYARD
1078 09564 7	✓	✓	✓	✓	ALLUVIAL PLAIN BIRD FOOT DELTA CANAL CAP CITY COAST COASTAL MARSH CROPLANDS FAULT FOLD GEOGRAPHY MOUNTAIN HYDROLOGY ISLAND JETTY LAKE

ATTACHMENT C

ERTS IMAGE DESCRIPTOR FORM

USER NAME REY Paul - AugustinDATE 05.25.73USER ID FO 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	VEGETATION	LAKE	RIVER	SEA	
1078 09564 7			✓	✓	MOUNTAIN PINNACLE SALTMARSH STREAM URBAN AREA
1101 10244 5	✓	✓	✓	✓	AGRICULTURE DECIDUOUS FOREST HYDROLOGY
1101 10244 7	✓	✓	✓		CITY COAST CROPLAND HYDROLOGY FOREST RURAL AREA
1102 10302 4					METEOROLOGY
1102 10302 5				✓	COAST DUNE METEOROLOGY
1102 10302 7	✓			✓	BAY CAPE COAST GULF DUNE ISLAND METEOROLOGY

ATTACHMENT C

ERTS IMAGE DESCRIPTOR FORM

USER NAME REY Paul - AugustinDATE 05.25.73USER ID FO 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	ALLUVIAL PLAIN	AGRICULTURE	HYDROLOGY	STREAM	
1114 09572 5	✓	✓	✓	✓	AIRFIELD BIRD FOOT DELTA CAPE COAST COASTAL MARSH DELTAIC COASTAL PLAIN LITTORAL DRIFT MARSH SEA SEA GRASS
1114 09572 7	✓	✓	✓	✓	AIRFIELD BIRD FOOT DELTA CAPE COAST COASTAL MARSH CONSEQUENT LAKE DELTAIC COASTAL PLAIN LITTORAL DRIFT MARSH SEA GRASS STREAM
1115 10024 5	✓	✓	✓	✓	METEOROLOGY
1115 10024 7	✓		✓	✓	CANAL GEOGRAPHY GEOLOGY MOUNTAIN METEOROLOGY VALLEY

A T T A C H M E N T C

ERTS IMAGE DESCRIPTOR FORM

USER NAME REY Paul - AugustinDATE 05.25.73USER ID FD 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	FOREST	MOUNTAIN	COAST	SEA	
1115 10030 4	✓	✓	✓	✓	LITTORAL DRIFT METEOROLOGY
1115 10030 5	✓	✓	✓	✓	AGRICULTURE BIRD FOOT DELTA COASTAL MARSH DUNE CONIFER CONSEQUENT LAKE FAULT FOLD GEOGRAPHY LITTORAL DRIFT METEOROLOGY SEA GRASS VEGETATION VINEYARD VOLCANO
1115 10030 7	✓	✓	✓	✓	CITY COASTAL MARSH CONSEQUENT LAKE DELTAIC COASTAL PLAIN EROSION FAULT FOLD GEOGRAPHY LITTORAL DRIFT MARSH METEOROLOGY SEA GRASS

ATTACHMENT C

ERTS IMAGE DESCRIPTOR FORM

USER NAME REY Paul - AugustinDATE 05.25.73USER ID FO 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	BAY	MOUNTAIN	COAST	SEA	
1115 10033 4	✓	✓	✓	✓	CAPE COASTAL CURRENT METEOROLOGY
1115 10033 5	✓	✓	✓	✓	AGRICULTURE ALLUVIAL PLAIN BRUSH CAPE CARTOGRAPHY COASTAL PLAIN CONIFER CROPLAND DECIDUOUS FAULT FOLD FOREST GEOGRAPHY GEOLOGY HARDWOOD FOREST IRRIGATION METEOROLOGY SCRUB VEGETATION
1115 10033 7	✓	✓	✓	✓	AGRICULTURE ALLUVIAL PLAIN CAPE CONIFER DAM FOLD FOREST GEOGRAPHY GEOLOGY METEOROLOGY RIVER

ATTACHMENT C

ERTS IMAGE DESCRIPTOR FORM

USER NAME REY Paul - AugustinDATE 05.25.73USER ID EO 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	MOUNTAIN	CANAL	STREAM	METEOROL.	
1150 09572 5	✓		✓	✓	COAST CONIFER SEA VEGETATION
1150 09572 7	✓	✓	✓	✓	BIRD FOOT DELTA CARTOGRAPHY COAST COASTAL MARSH DELTAIC COASTAL PLAIN HYDROLOGY LAKE SEA
1187 10023 5	✓	✓	✓	✓	CONIFER FOG FOREST RURAL AREA SNOW VEGETATION
1187 10023 7	✓	✓	✓	✓	CARTOGRAPHY CITY LAVA FOG FOREST GEOGRAPHY GEOLOGY HYDROLOGY KARST RIVER RURAL AREA SNOW VALLEY

ATTACHMENT C

ERTS IMAGE DESCRIPTOR FORM

USER NAME REY Paul - AugustinDATE 05.25.73USER ID FO 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	COAST	MOUNTAIN	SEA	METEOROL.	
1187 10025 4	✓	✓	✓	✓	LITTORAL DRIFT
1187 10025 5	✓	✓	✓	✓	AGRICULTURE ALLUVIAL PLAIN BRUSH CAPE CARTOGRAPHY CONIFER FAULT FOLD FOREST GEOGRAPHY GEOLOGY GULF RURAL AREA SALTMARSH SEA GRASS VALLEY VEGETATION
1187 10025 7	✓	✓	✓	✓	AGRICULTURE ALLUVIAL PLAIN BADLAND CAPE CITY COASTAL MARSH COASTAL PLAIN DELTAIC COASTAL PLAIN EROSION FAULT FOLD GULF HARBOR HYDROLOGY KARST

A T T A C H M E N T C

ERTS IMAGE DESCRIPTOR FORM

USER NAME REY Paul - AugustinDATE 05.25.73USER ID FO 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	CONIFER	VEGETATION	VALLEY	SNOW	
1187 10025 7	✓	✓	✓	✓	LITTORAL DRIFT MARSH MEANDER SALT MARSH SEA GRASS STREAM URBAN AREA VOLCANO
1187 10032 5	✓	✓	✓	✓	AGRICULTURE ALLUVIAL PLAIN CAPE COAST FOREST METEOROLOGY RURAL AREA SEA
1187 10032 7	✓	✓	✓	✓	ALLUVIAL PLAIN BADLAND CAPE COAST EROSION GEOGRAPHY GEOLOGY GRABEN HYDROLOGY METEOROLOGY MOUNTAIN SEA

A T T A C H M E N T C

ERTS IMAGE DESCRIPTOR FORM

USER NAME BEY Paul - AugustinDATE 05.25.73USER ID EO 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	SEA	METEOROL.	OCEANOGR.	COAST	
1204 09573 5	✓	✓	✓		AGRICULTURE VEGETATION
1204 09573 7	✓	✓	✓	✓	ALLUVIAL PLAIN CAPE CITY COASTAL MARSH GULF HARBOR HIGHWAY ISLAND MEANDER PINNACLE SALT MARSH STREAM
1204 09575 7	✓	✓	✓		
1204 09582 7	✓	✓	✓	✓	ISLAND
1227 10262 5	✓	✓	✓	✓	CONIFER FOREST GULF
1227 10262 7	✓	✓	✓	✓	COASTAL DUNE CONIFER FLOOD FOREST GULF HYDROLOGY RIVER

A T T A C H M E N T C

ERTS IMAGE DESCRIPTOR FORM

USER NAME BEY Paul - AugustinDATE 05.25.73USER ID FO 433AGENCY CNRS Service Carte Végétation BP 4009 31 TOULOUSE FRANCE

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS *				DESCRIPTORS
	BADLAND	CONIFER	DAM	FOLD	
1227 10265 7	✓	✓	✓	✓	ANTICLINAL MOUNTAIN BASSIN AND RANGE CARTOGRAPHY CROPLAND DECIDUOUS HARDWOOD FOREST IRRIGATION MASSIF RIVER SNOW SYNCLINE
1227 10271 7	✓	✓	✓	✓	BASSIN AND RANGE CANAL CARTOGRAPHY CITY CONSEQUENT VALLEY CROPLAND DECIDUOUS FOLD GEOLOGY HARDWOOD FOREST IRRIGATION LAKE RIVER SNOW